

Stout (A.B.)

ARCTIC DISCOVERY

READ BEFORE THE CALIFORNIA

DUP.

ACADEMY of SCIENCES

BY

ARTHUR B. STOUT, M. D.

JUNE 16th, 1879.



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THE ARCTIC REGIONS



LADY FRANKLIN BAY, LAT $61^{\circ}40'$ LONG $64^{\circ}30'$.

THE ACADEMY OF SCIENCES.

A special meeting of the Academy of Sciences was held last evening, for the purpose of giving a reception to Lieutenant DeLong and the officers of the Bennett Exploring Expedition to the North Pole, who are to start in a few days in the steam yacht *Jeannette* from this port. The interest manifested in this expedition is very great, from the fact that it was started by the enterprise and liberality of the proprietor of the *New York Herald*, and, besides, the Government has recognized its importance by detailing competent and skillful officers to direct its operations. A large number of ladies and gentlemen were present last evening to listen to the exercises. Dr. H. W. Harkness, Vice President of the Academy, presided, in the absence of President Prof. George Davidson on official business.

The following members of the expedition were seated on the platform: Lieut. S. W. DeLong, U. S. N., Commander; Lieut. O. W. Chipp, U. S. N., Executive Officer; Lieut. J. W. Dannheimer, U. S. N., Navigator; G. W. Melville, U. S. N., Chief Engineer; J. W. Ambler, Passed Assistant Surgeon; Jerome J. Collins, Meteorologist and special correspondent of the *New York Herald*, and R. L. Newcomb, Naturalist. Beside these were Charles Wolcott Brooks, ex-Consul of Japan, and William Bradford, the artist.

"ARCTIC DISCOVERY."

The first thing in the order of exercises was the reading of the following paper, by Dr. A. B. Stout, on "Arctic Discovery."

Mr. President and Fellow-Members: When, on a former occasion, we advocated the passage of a resolution by this Academy, addressed to the Congress of the United States, advocating and soliciting the desired authority and appropriation of funds to organize the Howgate Expedition, to explore the Arctic Zone, and, if possible, reach as far north as the North Pole, the objective question was asked (and properly enough), "In what good can it result?" *Cui bono?* The answer was, that a full reply to the query would fill an octavo volume. We now offer a concise and condensed answer to the question.

To recapitulate the past as completely as may be, we offer the accompanying tabulation, which we hold yet open for correction of Arctic explorations to the present time. This may offer a birds'-eye view of a landscape sublime—more gorgeously colored than ever human painter aspired to portray.

The suggested resolution was adopted and transmitted to the Senate of the United States. The appreciative thanks of Captain Howgate for the sympathy of the Academy on his projected expedition, have been duly rendered. The coöperation of the

West has been appreciated at the East.

To advance another step to-night; to accelerate the onward march to the North Pole of our hopes; to yet further interest this Academy in a scientific search which now enlists the ardent impulse of every Scientific Academy of the civilized world; to endeavor to warm every sympathy international; to engraft on our Government, which represents the progressive spirit of an enlightened people, aspiring to and indispensably requiring every aid in science to its practical promotion, is, in faithful zeal the object of this communication.

To-day two great enterprises propose to record their birth date.

First—The Howgate Colony Expedition, already inaugurated by Congress, and commenced by the preliminary outfit under Captain Tyson to Disco Island to gather supplies and equipment for the so-termed Howgate Exploration.

Second—The Bennett Expedition, under Lieut. De Long, in the *Jeannette*, to take its departure from San Francisco on or about June 20th, 1879. May our Academy wish them both God-speed on their eventful voyage!

ASTRONOMY.

It would be presumption on my part to expatiate upon the important problems in Astronomy to be solved by the discovery of the North Pole. These are scientifically indicated by W. E. Hickson, Esq., in a paper on the climate of the North Pole. [See *Journal R. Geog. Soc.*, vol. 35, p. 129, 1865.]

Herein is a clear elucidation of the effect on Arctic Summer and Winter, of the earth's relation to the sun; of the necessity to fix with precision the location of the Pole—to determine the flatness or the projection of the earth's surface at the Pole—to measure arcs of meridians; to give greater exactitude to the fixation of latitude and longitude of cities; to show the alterations of climate in long cycles of time; to compute the gradual variation of the plane of the ecliptic to that of the equator, with the consequent meteorological conditions. This author inclines to believe that land exists at the Pole, and proposes, in order to complete astronomical observations requiring time for their consummation, that all interested scientific nations shall combine to erect there an International Observatory. With steam power to aid, he sets no limit to his proud ambition.

Captain Sherard Osborn, writing in 1866 (*Journal of R. Geog. Society*, vol. 36), says most truly: "Arctic discovery must always claim the attention of all true lovers of geography and physical science, especially that of a society which represents the deep interest recently exhibited by all grades of the public in the solution of the problem of a communication between the Pacific and Atlantic, and of the world-wide sympathy in the noble devotion by which that mystery was solved." He informs that, from an estimate of Sir Leopold McClintock, the foot

expeditions in search of Franklin alone measure 40,000 miles, and that during 36 years of explorations by ship, boat and sledge, England only lost fairly one expedition, in 42 successive expeditions only lost 128 men, and of 100 sledge parties, not one has been sacrificed. He further states in extenuation of the perils, hardships, starvations, and dreadful exposures of life, that "the fact is, more sailors have been thrown to the sharks from the diseases incident to service in China, and on the coast of Africa, than ever fell in 80 years of Arctic service."

He calculates that from where, in 1827, Sir Edward Parry, in his boat expedition from Spitzbergen, stood on a sea of floating ice, on the night of July 22d, 1827, in latitude $82^{\circ} 45'$, he was exactly 435 miles from the Pole. This distance doubled for the return journey, gives 870 miles to travel; but Parry was defeated because the floating ice-field was carrying him faster to the south than his men could drag the sledges to the north.

From Cape Parry to the Pole and return, is only 968 miles; while, in 1853, McClintock travelled 1220 miles in 105 days. Meacham, in 1854, marched 1157 miles, in 70 days. In fine, Captain Osborn, in his enthusiasm, rather courts than shuns Arctic life; proves its endurance, in spite of its rigors, by the health and vigor of the "Arctic Highlanders," and presents, as the reward of the great achievement, 1,131,000 square miles of the globe's surface.

A letter to Sir R. J. Murchison, from David Gray, Esquire, 1868, a whaler, is worthy of note as indicating a fourth route to the Pole (Proc. R. G. S. v. 12, No. III.) It gives most cogent reasons for the adoption of this route, especially as it avoids the rush of water and ice southward through Smith Sound and Baffin's Bay.

TERRESTRIAL MAGNETISM.

Gilbert, in 1600, announced the bold hypothesis that "the earth is a great magnet," but he did not announce the cause or origin of the magnetism. But it was in 1576 that Robert Norman first discovered the dip or inclination of the magnetic needle; on the ground that if, at the magnetic equator, the needle poised precisely horizontally, it must follow the curvature of the earth, and dip as the needle was removed from the magnetic equator toward either the North or South Pole.

We have not space to enumerate the various and conflicting hypotheses advanced to explain this astonishing terrestrial magnetism. But the problem still remains to be solved. No explanation has yet passed the crucial test of scientific investigation. The nearest approximation has not yet met with conclusive confirmation.

Gauss, Ampère, Haasten, Goldsmidt and others, studied the phenomena of magnetic currents, and the needle's dip and variation as they existed in fact, but did not prove the origin of the magnetism. Practical results of great value were obtained. Finally, General Sabine discovered and announced, that under the various intensities of the action of the sun on the earth, the magnetic phenomena of the latter received very demonstrable variations in direction and intensity.

In the United States, Professor Bache, aided by numerous scientists, among whom figures the name of Dr. Kane, and also the United States Coast Survey, have together made important magnetic charts

for the aid of navigators and explorers on land. If General Sabine has demonstrated an important dependence of the earth upon solar magnetism for its magnetic phenomena, Dr. Kriegl, of Austria, has endeavored to enlist the moon as a potent factor in terrestrial magnetism. Professor Schwabe, German, has, by thirty years of daily observations, demonstrated that important relations exist between the variations of terrestrial magnetic intensities, and the variations of the sun spots "brighter than the sun," [see *Popular Science Monthly*, Sept., 1874, p. 536,] thus giving testimony in favor of Sabine's researches.

However advanced this state of knowledge may be, it is yet surrounded by an obscurity not yet resolved into unclouded light. The "open sea" of conjecture, ice-bound as it may be, is free to the suggestions of all explorers. Even it may yet be the destiny of some unpretending whaler to reach the North Pole in advance of the efforts of science, aided with all the power of steam.

We may then venture upon an hypothetical solution. The velocity of the earth's motion in its orbit around the sun is computed at 68,000 miles per hour, or 1,632,000 miles a day. The velocity of the earth's rotation on its axis is calculated at 1000 miles per hour, or 24,000 miles in 24 hours.

In accordance with the law of correlation of forces, we may consider that motion is converted into magnetism by the action of friction. Certainly, in the immense velocity of the earth's motion, in atmosphere as well as in the ether space external to the earth's atmosphere, there is friction.

However attenuated may be the ether in which atoms move, there is still some friction. The earth, in its orbit around the sun, moves in a medium of different density than that of the planet on its axis; hence the quality, the quantity, and the intensity of the magnetisms, or dynamo electricity, evolved by the two velocities in different media, would also be differentiated.

Again, if the earth's motion be converted by friction into magnetism, the friction being over the entire surface, the evolved magnetism must alike be generated over the entire surface everywhere within its range; but in accordance with natural laws, the product is collected or attracted into great magnetic currents, as the waters of the ocean are organized into great gulf streams.

The magnetic currents generated by the earth's motion on its axis could not stream through the exact geographical axis, but would be deflected, and therefore we have magnetic poles removed a distance from the true North Pole. It is evident, also, that herein the sun's actions on the earth would have its influence on the direction of the magnetic currents.

Within these two great streams of magnetism, either sufficient in force, and never failing supply to produce the terrestrial phenomena, and acting in differing lines, we have an intelligible origin of one of Nature's grandest and omnipresent energies.

The frost flower forms not on the window without its influence; the most elaborate crystal is the creature of its wonderful attraction. Eliminated in the brain, our thoughts are its children. Metamorphosed by the Divine will into a correlated force, Heaven's pure light illuminates the world. And again, converted into heat, its genial warmth fertilizes every flower; while, in its turn, the solar beam

relinquishes its unity of composition, and from its prismatic rays, adorns, in gorgeous coloring, every petal, sports, in fantastic grace, with the feather of the bird and the beauteous wing of the butterfly, glides the glowing morn, and at even, on western sky, utters, in radiant colors, its benediction, like the voice of God—good-night to weary man.

This faint picture brings us to the Aurora Borealis, that beautiful creation of the Polar Zone, that translucent light of the North, which man, with all his genius, can never imitate, but, like the Arab kneeling to the Sun, from the desert of his mind, can only worship.

For a time, the perturbations of magnetic currents, strange variations of the needle, perplexing irregularities of the compass, often so fatal to mariners, were ascribed to caprice, were termed "fitful" so fitful as to become at times "magnetic storms;" but patient investigations like those of Schwabe have reduced this wild behavior to the regular events of natural laws, acting at certain recurring intervals. Astronomers have demonstrated that the motion of the earth on its axis, as well as in its orbit, is accompanied with an oscillation like the majestic swaying of a vast balloon. This motion must also act as a perturbing influence.

Now the motion of the earth, in its orbit around the sun, generates its own magnetism, which, in its turn, must be collected into its own determined currents, and these may circulate in lines widely different from the former great magnetic tide—these, also, may undergo perturbations depending upon the varying proximity and heat of the sun, as well as the condition of the luminous sun spots, which, in their intensity of light, are represented to rival even the sun himself, as viewed by man.

Exultant in the wonderful beauty of these phenomena, as we sit, without peril, in our Temperate Zone, let us borrow a few lines from those who froze and trembled, but yet could not resist the glorious inspiration of Nature's majesty: "During the first morning watch, the sun, hitherto hidden by the mountains of Grinnell Land, suddenly shown out, causing a universal exclamation of wonder and delight. The line of reflected light was singularly brilliant, where it crossed the patches of water, and it was rendered iridescent where it fell on the edges of the hummocks, on the fractured ice, or on the pack itself. The irregular surface of the pack itself, comprising the general level of the young ice; the undulations of the old floes, and the sharp prominences of the old bergs, together with the unending diversity of form in the hummocks, kindled the imagination, which discovered every variety of form and of object, animate and inanimate.

"The bottom of these floes are usually covered with small lakes, formed during the short Summer by the melting of the ice and snow. These lakes are frozen solid during the Winter, but in the Summer and early Autumn they reflect the sun from their surfaces, and exhibit a variety of colors beneath." [See N. P. Expedition of ship *Polaris* pages 77 and 98.]

Happy the nature-enamored enthusiast, who, for a weary Winter of darkness, can exult when he wins a reserved seat on a glacier, in the dress circle of the Arctic Zone, thus illuminated, and revel with delight in this grand opera of Nature's play of colors. For our meek self, during a short season, we prefer a Boston rocking-chair, an opium-pipe, and a

schoppen of lager. Under the hallucination of De Quincy, we would perceive the

* * * "Borealis race,
Which flits ere you can point the place."

in a much more favorable light. These Arctic splendors are optical phenomena of reflection and polarization, but when they become blended with the still grander evolutions of terrestrial magnetism, an explanation appears to be found for the imitatively gorgeous pyrotechny of Northern Light. The effulgence of electricity liberated from its unseen terrestrial current into brilliant light and prismatic colors beams on the sky, illuminates with its fulminating rays the Northern Zone, and constitutes the Aurora Borealis.

What, then, are the advantages of Arctic exploration? What bounties will it return? What dividend from the stock? Of what good to man is this martyrdom of men?

We now seek in California some "high eminence" whence the heavens may be viewed through the most rarified translucent atmosphere. What grander observatory can be found than the Pole itself? What more felicitous site to observe the inexhaustible fountains of terrestrial magnetism than at the fountains of its concentration and departure on its wonderful cosmic errand? Where better might a Tyndall borrow the elements of light, a Hemholz measure the free vibrations of sound, or a Gelseler supply the tubes of his wondrous electric fountains and dazzling display of magnetic light?

When some thirty years ago a distinguished representative of California declared in Washington that California was a desert, and its land worthless for agriculture, and we now view its acres supplying the world with wheat, its cereals in every form filling the markets for the hungry, its luxurious vegetation adorning plain and hillside with its unrivalled scene of floral beauties, inviting the exotics of every land to come and contest with them the palm of loveliness—the fruits so overwhelming in abundance that we fail to consume them—the products of the dairy, which so immensely accumulate despite the cost of production—let us still remember that centuries ago a glacier mantle far heavier than that which congeals the germs of life in Greenland, ploughed with corroding power over the now called Heaven-blessed fields of California.

The achievement to first arrive at the North Pole and determine its physical "presentment," is no longer the actual competitive prize of international rivalry. Eager as each nation may be to win the victor's "belt," the attainment of that consummation, so devoutly to be desired, has become a secondary consideration. To cast a girdle round the globe is now a lightning-quick affair. To find the polar centre of that great zone is now the struggle, though often baffled, yet surely destined to be accomplished. Meanwhile, science has adopted the field and its produce as her own. Higher primary objects have intervened, to decorate, to adorn, to illuminate the subject. Every polar expedition, whether or not a failure to find the Pole, shortens the distance from 83° 26' to the goal. Every station taken to measure soundings, to find warm and cold currents by thermometrical tests, to dredge from the vasty deep its forms of animal life, is an advance in science. To press into the service of science a tiny flower, which, by the quick telegraphy of a polar actinic

ray, has in a few days burst open the frozen cerements imposed by a nine-months' glacier, to bring home a rock, a stone, to enhance geological lore and contribute its might to the great story of this world; to tell what life existed by its fossil memorials and in its etchings on the land-marks by the graver of an almighty sculptor; to teach us the history of those grand cosmic revolutions which man yet fails, with all his labor, to unravel; to trace the course of the great current of the Pacific Ocean, through the intricate Straits and Sounds of the Arctic waters into the Atlantic Gulf Stream, to profit by those tides instead of struggling by main force through Davis Straits in a counter current, manfully tilting with icebergs and northern gales; to show the route of the uprooted tree fallen from the banks of the Mississippi, in its wanderings on the ocean, until stranded on Arctic shore, it gladdens the heart of a hungry Esquimaux, who warms with its heat his scanty evening meal, and inspires grateful orisons to his Creator.

All these, with objects yet unthought of, are the germonds of the toil. What though a hard and violent death may leave to many a zealous hero no other reward than the glory of his deeds, are not the earnest martyrs of science found on every field of life and in every clime? Would not the thought-exhausted Peterman had better found his storm-beaten monument by the side of Franklin, or where Hall died? Is not his unhappy fate the destiny of thousands of his too-ambitious followers?

COMMERCE.

Quickly in the wake of science will follow commerce. Enterprising as she may be, she will not venture her argosies without high insurance. More stations, better charts, sharper defined coast lines, more thoroughly established "open water" must precede her cautious navigation. Still, with her success will be answered the mercenary *cui bono* inquiry.

The riches that have been derived from the polar latitudes are too immense to be calculated to-day. Whale oil and spermacetti are not yet entirely superseded by gas and kerosene; and if they were so, whalebone or baleen is yet of high value. A whaler of to-day is paid for his voyage in baleen alone.

The discovery of coal in Behring's Straits and in high latitude on the west coast of Greenland will greatly diminish expense, while income will be in a far greater proportion increased. The produce of furs must greatly augment the accession to the minor fisheries with less peril to life, and shorter voyages cannot be estimated. In the Siberian seas, salmon exist in countless multitudes. Many steamers navigate the great rivers of Northern Russia. With these trade will be opened. California wheat may penetrate to the interior of Russia, and American manufactures, now prized throughout the world, may pass the Behring's Straits, to be sold in Tobolsk, on the Obi.

Besides these, elephant ivory, walrus tusks, mosses, lichens, feathers, *et id omne genus*, abound to court the grasp of predatory man.

EXPENSE.

The cost of former Polar expeditions is far less than might be supposed: thus, Willoughby's expedition, 800 years ago, cost \$30,000; Moore's expedition in 1746, \$50,000; Back's expedition in 1833-5, Great Fish River, \$25,000; Meddendorf, Siberian, 1844, \$8583; Franklin expeditions, from 1845 to

1854, \$4,166,665 (English Admiralty statement); German North Pole expedition (second) \$55,000; Austro-Hungarian expedition, \$91,665.

The cost of an ordinary whaling voyage of nine months, vessel of 300 tons or 1000 barrels of oil, including vessel's value, is about \$35,000. A whaling vessel from San Francisco, from March to October, is calculated on those conditions. A whaling voyage from New England was fitted for three years at an investment of from \$60,000 to \$70,000.

SCURVY.

The great perils of the northern clime, famine and incessant toil, are not the only dangers which beset the polar explorer. Under them exhausted Nature's vital spark at last glows dimly, fidelity and heroism slowly succumb, and that worst of all demoralizing agencies, invades. The scurvy, as a final and fatal tormentor, appears. We offer a few comments on this disease. Its accidents are known, its *rationale* is not yet clearly explained. This pathological field is, therefore, still open. The scorbutus, or scurvy, is by no means limited to the frigid zone. It is not absolutely dependent upon food. Though partially a disease of nutrition, it is not strictly the product of alimentary inanition. It may develop in any climate, irrespective of vegetable, animal, acid, alkaline or oleaginous food. When the Spanish galleons returned from Asia across the Pacific temperate latitude, the scurvy decimated their crews. They anchored at Cape St. Lucas. Though laden with the spices and wealth of Cathay, they were dying for lack of a special fruit in Southern California.

In the Crimean War, where, single-handed, Russia so obstinately fought the European idea of "the balance of power," the scurvy worked the most fearful havoc in the French and English encampments.

In all expeditions where physical labor is urged in excess of vital nervous force, irrespective of nutriment (lime juice to the contrary notwithstanding), the scurvy will develop. It is a disease of progressive exhaustion—of organic vital involution—in a word, it is a disease of the brain. It is an exhaustion of the cerebral neuric battery. Its voice exclaims, "Cease this style of toil, or every tissue of the organism, nerve, bone, muscle, the last yielding power of brave men—the valiant WILL to do or die—must degenerate and wither!"

The initiatory symptoms of the disease are cerebral, and indicate that the entire brain and nervous system are involved. A first sign is change of character; cheerfulness is exchanged for moody sullenness, irritability of mind. Then follow prostration of energy, indifference to toil, or even to move about. Then succeed languor, and both mental and muscular depression, loss of appetite; the secretions now begin to alter, the limbs swell, become painful, and edematous, either constipation or diarrhoea, succeed from insufficient nervous nourishment from the brain. It is unnecessary here to picture the full course of the malady, but the more its progress is contemplated, the more convincing is the evidence that the exhausting brain power is the cause of the long line of debilitating effects which characterize the dread disease. We would like, therefore, to suggest that the best treatment to pursue is to support and encourage the failing brain, but, unfortunately, this is difficult to accomplish in Arctic life. The work

must progress, the march must be onward. The inexorable cold, which is the chief cause of the cerebral exhaustion, cannot be avoided.

COLD.

To counteract the depressing influence of intense cold requires the consumption of the great bulk of internal animal heat derived from the food eaten. It is only a comparatively small balance of energy, of vital force, which remains for the great labor demanded by the journey. More than one half of the composition of the human body is fluid. An Indian skeleton, perfectly desiccated, now in our Museum, weighs nineteen pounds.

When, then, we remember that in the Arctic belt the thermometer sinks forty, aye, fifty, degrees below zero Fahrenheit, we inquire in wonder, Why does not all that fluid freeze, and in its congelation leave the man a lifeless statue of ice? Why does not the blood freeze in the heart? Why are not the blood channels by which the brain is irrigated, its loss and gain by wear, replenished? Why are not the aqueous and vitreous humors of the eye crystallized into solid ice? It is because the supply of heat from the accelerated rush of blood through the system is called upon to rapidly supply the waste by the extreme cold. When this balance of power fails, the individual must die. This thirst for heat is manifested by the voracious appetites of Arctic hunters. When, then, this extraordinary effort of the brain to furnish the exalted heat strain is considered, without even reference to the demand for great external manifestations of vital energy, it cannot be wondered at that the vital fire of life burns low, and all the structures of the body degenerate into that state we designate as scurvy.

A first curative relief, then, is to study the economy of this brain force and vital heat. No waste should be allowed by the expenditure of strength, except for indispensable necessities. We would deprecate exercises for mere amusement to keep men in motion, but recommend rest moments at well-advised intervals.

While stimulants are highly requisite, if we force the fire too rapidly by artificial fuels, in the long run we shorten the life to be consumed. Among the known anti-scorbutics, lime juice, raw vegetables, etc., the abundant Oregon cranberry ought to figure as valuable. Among trappers and hunters, pinole is highly prized. The earthy phosphates are powerful brain nutriment, but those of the alkalies have the objection that their large proportion of soda potassa, or ammonia, thins and dilutes the blood. The Indian carriers of heavy loads in the Andes use the coca leaf. The action of this plant is to increase endurance, and obviate the almost irresistible desire to sleep in the most surprising manner. The fluid extra of coca, therefore, ought to be an invaluable aid; but as this freezes, and is difficult to transport, we have composed a dry powder condiment which every man can easily carry in his pocket. This condiment can give a relish to many a raw or revolting meal with which the Arctic explorer is forced to satisfy his long-forgotten epicurean taste.

When the traveller in the North has acquired what may be called the scurvy diathesis, he is beset by another direful scourge. Frost-bite is greatly facilitated. His feet swell, and he must loosen his fur or canvas boots. The neuralgia in the frost-sores becomes excruciating, labor impossible, and

the highest degree of nervous irritability is engendered. This pain, so much exaggerated beyond that of a simple local wound, indicates how intimately the state of the brain is connected with the local accident.

It so complicates and imperils life that, during the Crimean war, the surgeons were restrained from amputations. The young surgical assistants were absolutely forbidden to touch the frozen parts with the knife.

It is manifest, then, that the brain must be first appeased before local treatment can avail.

In the Austro-Hungarian expedition, Payer states that colloidion, with iodine, was often of great use as a local application.

We would infer, though having no conclusive experiment, that magneto-electricity would serve to reanimate the falling nervous system.

An induced current passed through the brain and spinal axis might supply new energy. While, as a local stimulus, it would revive languishing granulation in frost-bite ulcerations, promote cicatrization and appease, perhaps, the excruciating neuralgia of the sores.

Should the electric light be employed on the Bennett Expedition, a diverted current might be passed through an apparatus to reduce intensity, and be thus utilized as an hygienic appliance.

We would further indicate the fluid extract of malt, associated with the hypo-phosphite salts, condensed milk and compressed coffee.

The new antiseptic, borate of soda and potassa, to preserve meats, fish, etc., will be an invaluable acquisition.

TITLE.

Who shall own these vast possessions?

Who owns them now?

At present, all explorers, all nations, are pleased to penetrate the vast embattlements which mark and guard the Pole, the floes, the bergs, the hummocked crushing masses, "old ice" on one side, "new ice" on the other, dense fog, ice below, snow above, the northern blast, the unconquerable glacier—and who shall win the first discovery, "so longingly coveted?" But all are too happy to escape with their lives therefrom, and be welcomed again to the genial home.

Already on cape, sound, strait, and bay, on every "land" floats the possessory banner of a nation. Should a climatic revolution suddenly restore to fertility and civilization, warmed with tropical temperature, what would not be the contests in International Congress to fix the frontiers! History would repeat itself. The autochthones would be ignored. The native proprietor, whose favor we now court with trivial presents, would be again despoiled—whose furs, dogs, sledges, we now purchase with paltry bribes or insignificant tools for their simple industry, would be assigned to Reservations, with Indian Agents for their Great Father.

The walls of China have been overridden and the nation forced from its seclusion, now again to be driven back within its broken parapets. In like manner will the feeble but indispensable Esquimaux be first courted with bribes, caressed, and then of his ice-girdled home be dispossessed.

We can but say, such is mankind; such the human race. "Such," exclaims Burke, "is the mode of existence decreed to a permanent body composed of transitory parts wherein, by the disposition of a

stupendous wisdom, moulding together the great mysterious incorporation of the human race, the whole at one time is never old, nor middle aged, nor young, but in a condition of unchangeable constancy, moves on through the varied tenor of perpetual decay—fall, renovation and progression."

Evolution and involution succeed each other in their eternal orbit.

ADIEU.

As Pioneers of Science in this "western land," we can only exclaim to our proposed expeditions, the daring pioneers of the Arctic Zone, while we wave to them in farewell the banner of our country, hoping again to run it to the peak to salute their safe return, "GOD SPEED THEM!" and impress on their mind our favorite motto, with Liberty presiding over the two Americas, "*Hæc sit Patria Nostra!*"

Dr. Harkness then introduced Lieut. DeLong, the commander of the expedition, to the audience, who was received with much applause, and who spoke as follows:

"When the officers of this expedition were invited to attend this meeting, I answered that nothing would give us greater pleasure, but we hoped to be excused from taking any part in the discussions until after our return from the Arctic regions. This amiable peculiarity of ours, it seems, is not to be tolerated, however until I am to reply with any degree of propriety to the very kind expression of your wishes. As for this particular expedition, there is nothing much to say. It has been made, possibly, by the liberality and enterprise of a single individual, and he has placed it in charge of officers of the Navy, and by an Act of Congress it has been awarded official sanction. It is peculiar in another way, for it is the first to attempt to reach the North Pole by going through Behring's Straits. Other vessels and expeditions for the relief of Sir John Franklin have gone through this Strait, but this will be the first practical Arctic Expedition to attempt this route toward the Pole. We expect to undergo the same trials and embarrassments as other polar explorers have met with.

"We shall begin our work at the 71st parallel of latitude. Beyond this, all is unknown, and we shall first determine whether there is land, ice or sea. You will excuse us from further outlining our work until our return, when nothing will give us greater pleasure than to tell you all we have done."

Dr. F. Baehr and Mr. J. P. Moore were called on by the President, and briefly responded. The latter gentleman spoke in behalf of the Microscopical Society, and hoped that among all the benefits which should accrue to science from this expedition, that his special department might be the gainer by important discoveries.

Charles Wolcott Brooks was then called upon, and responded on behalf of the ethnological section of the Academy. In offering his word of kind encouragement, he remarked that men who use obstacles as stepping-stones to success, are apt to win; and he but expressed the universal desire of all ethnologists that Lieut. DeLong and his brave comrades should overcome every barrier that the Frost King might impose as an obstacle to their success. As ethnologists, we all feel great interest in the existence of an Arctic Continent, and earnestly desire to know if it is, or can be, inhabited. In a world governed by mathematical law, whose every atom is geometrically correct, and subject to mathematical

proof, we may reasonably judge of the unknown by what we can see, cautiously using the great law of analogy as our guide. If we would judge of the ultimate atom, or the most distant orb in space, we may study for that purpose some object around us, or our globe taken as a whole. He who has watched the organization of crystalline forms, under electric currents, has seen the operation of the same law which has formed the solid part of the earth we live on.

In its early and plastic condition it was a sphere like the dew drop, but with the constant currents of organizing magnetism, it has assumed a crystalline form, and to-day its solid exterior, were its oceans emptied and removed, would present the polyhedron. If we carefully examine the almost universal features of all land known to us, we find a prevailing form wherever we turn. Each territorial area of magnitude seems to have an appendage trending southward. Thus, south of the large continent of North America we find that leg-of-mutton or *pen d'oreille* form of South America. Beneath Europe rests a similar shaped area of land in the continent of Africa, and south of Asia is Australia and the Polynesian or Spice Islands. The same relative position of land is general among many island groups, and all peninsulas seem also to point southward, such as Kamchatka, Alaska, Lower California, Florida, Nova Scotia, Hindostan, etc., and all such forms have larger bodies of land to their north. Now, if we apply this rule, by turning the North Pole of a globe toward us, we readily see at a glance that Greenland, which is known to us, may bear to an unknown Arctic Continent the same relation that South America does to North America, or Africa to Europe. Hence it is perfectly logical to infer, by the great analogy of nature, that an Arctic Continent exists beneath the North Pole, extending three and a half to four degrees south from the northern axis of the earth. As previous Arctic expeditions have advanced to 83° 26' north latitude—or within 394 miles of the Pole—the distance thence to such a continent would not exceed about 150 to 180 miles. This intervening space, however, is quite difficult to traverse, as it is represented to present a very rough surface. If the sea, during the height of a gale, when waves ran mountains high, were instantly frozen, it would present much the appearance here encountered.

Now, for ethnologists, the question is, Can an Arctic Continent be inhabited, should one exist? This may be met by the already-expressed surmise that the latitude of 76° is about the point of lowest mean temperature. The earth is about 37 miles more in diameter at the equator than from pole to pole, having enlarged at one point and flattened at another, because of its revolving motion. Now, it is well known that lower temperatures are encountered as we ascend high altitudes, and the depression at the poles may, by lessening the distance of the surface from the earth's centre, afford a warmer temperature, which will enable the hardy Esquimaux, Ainos, or some Hyper-Borean race, to exist upon an Arctic Continent. Should such prove to be the case and our good friends discover any races there to us unknown, we shall look to them to resurrect us a specimen skull of some departed inhabitant.

In the quiet stillness of their long Winter evening we trust they may occasionally think of their California friends, whose hearts go with them. In-

dividual happiness depends so largely upon the quality of human thought, that we feel, after meeting our brave guests face to face, that when far away among the auk and fulmer and silent pelicans of the still more silent North, though limited in number to a comparatively small but trusty band, they will have ample company when surrounded by the multitude of grand and noble thoughts their perilous but most interesting expedition, will inspire.

Therefore, on behalf of men of science throughout America, and I may safely say throughout the world, we bid them one and all God speed and success and a safe return, with all the good results their souls may crave.

William Bradford, the well-known artist, whose pictures of Northern scenery are justly appreciated, was called on for some remarks by the Chair, and said that he could not but feel proud at the daring shown by the members of this expedition, for they knew that in attempting to reach the Northern regions by the way of Behring's Straits they were liable to be carried from home instead of toward it, should they be cast away or their vessel

become wedged in by the ice fields. This was the experience of all who had attempted the route, while those on the other side, by way of Baffin's Bay and Greenland, in case of accident, were hourly drifted toward home and relief. He closed with a fervent hope that they might be spared to return in health, and their efforts be crowned with success. The eloquent remarks of the gentleman met with the liveliest response from all the audience.

Mr. Jerome J. Collins, a member of the Expedition, said that he went in a double capacity that of a specialist in meteorology and a representative of the Press. He should specially investigate the law of storms above the latitude of 60°. From the equator to this point the researches of science have pretty thoroughly established the rules governing them; but above this point all was uncertain. He and his companions were satisfied with their leader, and nothing should be left undone on the part of any one connected with the party to make the result of the expedition of great value.

The meeting then adjourned.

